

CLAIMS

1. A cardan joint (20, 20a, 20b) comprising:
first and second shafts (28) wherein each shaft has an end (32, 32a, 32b, 32c, 32d, 32e);
first and second universal joints (124, 124a, 124b, 126, 126a, 126b) individually connected to said first and second shafts (28) adjacent said respective ends (32, 32a, 32b, 32c, 32d, 32e);
an intermediate coupling member (26, 26a, 26b) positively connected with said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) wherein each of said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and both shaft ends (32, 32a, 32b, 32c, 32d, 32e) being positioned in said intermediate coupling member (26, 26a, 26b); and
a centering disk (56, 56a, 56b, 56c) positioned in said intermediate coupling member (26, 26a, 26b) between said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and having a receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c) engaging both shaft ends (32, 32a, 32b, 32c, 32d, 32e) characterized by said receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c) being moveable longitudinally in said intermediate coupling member (26, 26a, 26b).
2. The cardan joint (20, 20a, 20b) of claim 1 wherein said centering disk (56, 56a, 56b, 56c) includes a disk member defining an aperture (118, 118a, 118b, 118c) and said receiving portion comprising a bushing (62, 62a, 62b, 62c) positioned in said aperture (118, 118a, 118b, 118c).
3. The cardan joint of claim 2 wherein said bushing (62c) is movable relative to said disk member (56a).
4. The cardan joint of claim 3 wherein said bushing (62c) includes a body (127) and first and second radial flanges (128, 130) extending

from opposite ends of said body (127) wherein said disk member (56a) is positioned between said first and second radial flanges (128, 130).

5. The cardan joint of claim 4 including a resilient washer (134) positioned surrounding said body (127) between said disk member (56a) and one of said first and second radial flanges (128, 130).

6. The cardan joint of claim 4 wherein one of said first and second radial flanges (128, 130) extends transverse to said body (127) and the other of said first and second radial flanges (128, 130) extends at an acute angle relative to said body (127).

7. The cardan joint (20, 20a, 20b) of claim 2 wherein said disk member (56, 56a, 56b, 56c) includes a radial groove and said bushing includes a radial flange receiving in said radial groove.

8. The cardan joint (20, 20a, 20b) of claim 1 including by a biasing device (80, 80a, 80b, 134) urging said receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c) longitudinally in said intermediate coupling member (26, 26a, 26b).

9. The cardan joint (20, 20a, 20b) of claim 8 including wherein said biasing device (80, 80a, 80b) is further defined as a spring washer (80, 80a, 80b).

10. The cardan joint (20, 20a, 20b) of claim 9 wherein said centering disk (56, 56b, 56c) includes an annular notch (122, 122a, 122b) and said spring washer (80, 80a, 80b) is positioned at least partially in said annular notch (122, 122a, 122b).

11. A cardan joint (20, 20a, 20b) comprising:

first and second shafts (28) wherein each shaft has an end (32, 32a, 32b, 32c, 32d, 32e);

first and second universal joints (124, 124a, 124b, 126, 126a, 126b) individually connected to said first and second shafts (28) adjacent said respective ends (32, 32a, 32b, 32c, 32d, 32e);

an intermediate coupling member (26, 26a, 26b) positively connected with said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) wherein each of said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and both shaft ends (32, 32a, 32b, 32c, 32d, 32e) being positioned in said intermediate coupling member (26, 26a, 26b); and

a centering disk (56, 56a, 56b, 56c) positioned in said intermediate coupling member (26, 26a, 26b) between said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and having a receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c) engaging both shaft ends (32, 32a, 32b, 32c, 32d, 32e) characterized by said centering disk (56, 56a, 56b, 56c) comprising a plurality of support tabs (82, 150, 150a, 158, 158a) for supporting bearing engagement between said centering disc (56, 56a, 56b, 56c) and said intermediate coupling member (26, 26a, 26b).

12. The cardan joint (20, 20a, 20b) of claim 11 wherein said plurality of support tabs (150, 150a, 158, 158a) extend along a longitudinal axis of said disk member (56, 56b, 56c).

13. The cardan joint (20, 20a, 20b) of claim 11 wherein said plurality of support tabs (82, 150, 150a, 158, 158a) are spaced in mirrored relation to one another.

14. The cardan joint (20, 20a, 20b) of claim 11 wherein each of said plurality of tabs (158, 158a) include an axial surface and a radial surface and said axial surface contacts said intermediate coupling member (26, 26a, 26b).

15. The cardan joint (20, 20a, 20b) of claim 11 wherein each of said plurality of support tabs (150, 150a) include an axial surface (156) and a radial surface (154) and said radial surface (154) contacts said intermediate coupling member (26, 26a, 26b).

16. The cardan joint (20, 20a, 20b) of claim 11 wherein said plurality of support tabs (82) extend radially from said disk member (56a).

17. A cardan joint (20, 20a, 20b) comprising:
 first and second shafts (28) wherein each shaft has an end (32, 32a, 32b, 32c, 32d, 32e);
 first and second universal joints (124, 124a, 124b, 126, 126a, 126b) individually connected to said first and second shafts (28) adjacent said respective ends (32, 32a, 32b, 32c, 32d, 32e);
 an intermediate coupling member (26, 26a, 26b) positively connected with said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) wherein each of said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and both shaft ends (32, 32a, 32b, 32c, 32d, 32e) being positioned in said intermediate coupling member (26, 26a, 26b); and
 a centering disk (56, 56a, 56b, 56c) positioned in said intermediate coupling member (26, 26a, 26b) between said first and second universal joints (124, 124a, 124b, 126, 126a, 126b) and having a receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c) engaging both shaft ends (32, 32a, 32b, 32c, 32d, 32e); and
 a spring (60, 60a, 60b) positioned in said intermediate coupling member (26, 26a, 26b) between said shaft ends (32, 32a, 32b, 32c, 32d, 32e).

18. The cardan joint (20, 20a, 20b) of claim 16 wherein said spring (60, 60a, 60b) is positioned in said receiving portion (118, 118a, 118b, 118c, 62, 62a, 62b, 62c).